THE SUDAN

DEVELOPMENT PROGRAMME

1951 / 56

(This short account is based upon the programme as it stands approved in the 1953/54 Budget.

All figures given are as stated in that budget.

In the course of the budgetary year, some estimates may be revised and new schemes may be added.

The whole programme is reviewed annually to give opportunity for modification or extension of projects and the submission of revised estimates of cost.)

Development Branch, Finance Department, Khartoum, Sudan, 1953

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THE 1951/56 DEVELOPMENT PROGRAMME

1. Introductory

This is the Sudan's second Development Programme, following the 1946/51 Development Programme of capital works for which £.13,750,000 was allotted.

A programme - not a plan

It is to be emphasised that it is a programme and not a plan. It has not yet been possible to conduct the detailed survey of resources and potentialities and needs that would be necessary to assemble the data on which a comprehensive plan would be constructed. It is a programme made up by inviting Ministries and Departments and Governors of Provinces to submit proposals of a capital nature which seemed to them to be desirable. These proposals included very comprehensive programmes for expansion of the Sudan's health and education facilities, submitted by the respective Ministers. From these proposals, the Development Committee (a sub-committee of Executive Council) selected the more important and more pressing projects for inclusion in the Programme. Almost all aspects of Government's activity find some place but there is no balanced plan, as attempted in some other countries, to achieve a target in increased production, or in the expansion of particular social or technical services, or in raising standards of living.

The public pressure for rapid expansion of the health and education services, and for some administrative services, and for public utilities such as water and electricity schemes and telephones, partly explains why the 1951/56 Development Programme includes only limited expenditure on schemes that are immediately and certainly productive of additional wealth. Another reason is that in absence of any survey of economic resources and possibilities for development, no wise plan for the Economy could be devised.

Programme covers only new Government capital works

It should be emphasised that the 1951/56 Development Programme does not set out all of the advances that are being made in the Sudan in the period. Government is expanding and improving its services over a wide field in advances that

are financed outside the Programme as normal administrative expansion, or as "betterments" or "renewals" rather than as "Development". For under the Sudan budgetary system, only new projects of a capital nature find their home in the Development Programme.

Again, the Development Programme is concerned only with Government investment in new works. Private enterprise is contributing substantially in commercial development of pump-irrigated agricultural schemes. light industry is expanding. and much private capital has been invested in new building of office, shop and house property, and in holding increased stocks of goods for trading.

Programme does not meet full costs of all projects

It is also necessary to remark, for any who may be unfamiliar with the Sudan's budgetary practice, that the amount shown for a scheme in the Development Programme generally includes only the capital works necessary, leaving staff and other recurrent costs involved in the project to be charged to the ordinary Sudan budget. Thus, the Development Programme scheme "Expansion of the Geological Survey" includes provision for equipment and buildings to serve new staff for a greatly expanded programme of geological mapping and related activities, but the cost of staff salaries, and of running the motor transport they use and other such expenses, falls to the ordinary budget. Thus the figures shown for the Development Programme under-state the full cost of the projects that it contains.

Launched at £.24 millions

The Programme was launched in 1951 within a framework of £.24 millions. This was after a year of quite extraordinary accretion of wealth to the Sudan in the commodity boom. Almost all the Sudan's exports earned record prices in 1951 and 1952 and in the case of cotton, the chief item in the export list, record prices were gained for a crop of extraordinarily high yield. Government's revenue swelled, creating an immense budget surplus, as it took its share in the exceptional proceeds of cotton grown on the Gezira Scheme, earned greatly increased revenue from export duties (generally assessed on value but with a special export duty on cotton) and also on import duties as with more money in the hands of the public importers brought in more manufactured goods for sale. The dispersal of this wealth among all sections of the community gave increased Government earnings from most taxes and other sources of

revenue. And it was clear that a high level of Government receipts could be expected in the next year, for Business Profits tax on past profits would be buoyant and the demand for imported goods, mostly subject to import duty, could be expected to continue with so much of the year's income in the hands of the public still unspent : this, even if cotton and the other export crops should be much reduced in quantity and value. £.24 millions was a generous, but realistic, figure within which to cast a 5-year Development Programme.

Now framed within £.34 millions

Revenue in 1951/52 continued buoyant, though not at all on the scale of the previous period, and the 1951/56 Development Programme was revised in 1952 to a figure of £.32 millions, a large number of new schemes being admitted to take up most of the additional funds. A second revision followed in 1953, to £.34 millions, but this advance was necessary to meet rising costs on the projects already in the Programme (and after some schemes had been withdrawn and others curtailed as changed circumstances had suggested) and left little for allocation of new projects.

Almost entirely financed from revenue

The full £.34 millions has not yet been passed to the Development Account which feeds the Development Programme. Revenue in 1950/51 and 1951/52 gave £.27 millions for this Account and 1952/53 revenue, on a much reduced budget surplus, £.2½ millions. The balance to make up the £.34 millions will be found partly (about £.1½ millions) from some available funds in other Government accounts and partly from revenue during the remaining three years of the Programme.

2. Analysis of the Programme

The £.34 millions is distributed as follows :

	LE.	Percent of total
Communications	9,260,000	27
Productive Schemes	7,843,000	23
Public Utilities	5,145,000	15
Social Services	6,885,000	20
Administration	4,107,000	12
Reserves and Unallocated	760,000	3
	34,000,000	100

A more detailed analysis of each group is given at the head of the sections following.

3. Communications

Sudan Railways extensions & equipment	£.4,500,000
Roads machinery and general expenditure	1,363,379
Trunk roads	1,100,000
Other roads	510,000
Telephones	908,800
Telegraphs	73,000
Posts & Telegraphs Offices	158,085
Miscellaneous Posts & Telegraphs Items	41,500
Airports	478,600
Sudan Airways expansion	115,000
Meteorological Services	11,400
	£.9,259,764

Sudan Railways extensions and equipment

The major item in this group is the provision of £.4½ millions for capital advances to the Government-owned Sudan Railways. The Sudan Railways are operated on commercial principles, paying 4 per cent interest on the present assessed capital of £.13 millions provided by Government and meeting the debt service on other capital. The balance of net revenue earned is available for Sudan Railways capital expenditure, including renewals and replacement of assets.

Sudan Railways now have in progress an £.8,897,833 programme of capital expenditure of which £.3,708,800 is for replacement and betterment of existing assets and £.5,189,033 for additional assets. Sudan Railways expect to be able to finance about half of this programme from their own resources and the £.4½ millions from the Sudan's 1951/56 Development Programme will meet the balance.

Whilst the £.4½ millions is not specifically assigned it may be considered in relation to the £.5,189,033 programme of additional assets. The chief items in this programme are the railway extension, Sennar Junction to Roseires (£.1035,000) new berthing facilities at Port Sudan (£.672,500), 10 main line engines (£.472,434) and rolling stock (£.693,750). Buildings, mostly housing for staff, will cost about £.600,000 and sundry items of plant and machinery about £.400,000. River craft for the Southern Services are allotted £.827,550.

Roads development

A first group of schemes provides about £.850,000 for the purchase of the plant and machinery for economical road construction by modern methods. Two "General Expenditure" schemes adding up to nearly £.500,000 meet the salaries of staff and other costs necessary to plan a roads construction programme and to organise and supervise its execution over the 5 years.

When a road is begun, the cost of operating and maintaining the plant to be employed, the cost of materials and the cost of labour are charged to the job in hand. For work on the construction or improvement of trunk roads, there is £.1,100,000 available and it will be appreciated that with the great distances of the Sudan all that can be afforded over most routes is clearance of a track, bridging where necessary, gravelling in weak stretches and grading; bitumen carpets can be justified only in a few important towns. Out of the £.1,100,000 about £.400,000 stands allotted for improvement, including stabilised gravel, of the important road from Omdurman to El Fasher, which carries much long-distance traffic. About £.335,000 is provided for a second important trunk road, from El Obeid to Wau. The other trunk road projects are much less costly. £.50,000 stands for the road El Fasher to Keb Kebiya, £.66,000 for the road from Juba to Jambo Corner, £.60,000 for the route El Ugda - Renk - Juba, £.35,000 for a bridge at Wau, and £.35,000 for the Dilling - Kadugli road.

For roads of less importance, there is provision of £.510,000. This will be spent on a wide range of improvement schemes, chiefly on the major Province roads. The work will raise the standards of almost all the roads that carry much traffic.

Telephones

In the Sudan, telephones are Government-owned, operated by the Posts and Telegraphs Department. The recent years of prosperity have been reflected in increased public demand for telephones and in much-increased use of telephone services. The Development Programme includes a group of schemes totalling a little more than £.900,000 to improve and extend telephone services and to provide more connections to subscribers. To meet the call for more house and office installations in Khartoum, Omdurman, Port Sudan and a number of other towns, exchanges are to be extended and distribution cables laid at a cost of about £.230,000. Improvements to lines to give better service and to handle more calls will require about £.260,000 whilst £.355,000 is being spent on a line from the Nuba Mountains to Malakal, at present without telephone connection, and £.45,000 on a radio telephony link (open for public calls) between Juba and Khartoum, not otherwise served.

Telegraphs

General "up-grading" and extensions to the telegraph network, including the provision of apparatus which will enable a greater volume of messages to be carried on existing lines, is provided for at £.73,000.

Posts and Telegraphs Offices

The biggest item is the new Omdurman Post Office at £.70,000. This will give much-needed office space for Posts and Telegraphs Department staff as well as the public counters on the ground floor. New or improved Posts and Telegraphs Offices are scheduled for El Obeid Zalingei, Shendi and Dueim and at a number of smaller towns.

Airports and airfields

The major project, with £.365,000 allotted, is for work on the development of the Khartoum Civil airport. The main runways at this airfield have been improved at the expense of the United Kingdom Ministry of Civil Aviation. The Sudan is paying for the taxi-tracks and parking aprons at this airport, at a cost of about £.145,000, and for a new block of terminal buildings at about £.200,000, including equipment and furnishings; the balance of about £.20,000 is for airport safety equipment. The block of terminal buildings provides all the facilities expected at a modern airport including restaurants, shops, American bars, and public reception rooms as well as accommodation for the airport operations staff, airline companies and air handling firms, passenger and freight customs, immigration and health offices and an animal quarantine. Much of the accommodation will be rented to airline companies, caterers and other business firms and thus earn a direct revenue.

The second important airport scheme, for which £.70,000 is provided, is to lengthen and improve the runway, and to provide modest terminal buildings, at Asoteriba, the airfield which serves Port Sudan.

At Juba, improved airfield buildings are to be erected for £.10,000. A new airfield had been laid out at Wad Medani in Blue Nile Province for £.15,500 and at Dueim also in Blue Nile Province, a landing ground has been completed for about £.13,000. These two new airfields make possible regular Sudan Airways services between these towns and Khartoum.

Sudan Airways expansion

The Government-owned Sudan Airways began operations in 1947 with a fleet of four Dove aircraft (6 to 9 passengers) which with their spares and the adaptation of existing workshops and hangars at Khartoum airport cost about £.88,000, found from 1946/51 Development Programme funds.

In the current 1951/56 Development Programme, a fifth Dove was added to the fleet in 1952 and also a 3-seater Auster aircraft for short distance and charter flights. These cost about £.22,000. Public demand on the chief routes has for some little time exceeded the capacity of the Dove services and in 1953 two Dakota aircraft (26 to 40 seats) were purchased for about £.44,000. They are to be employed initially to give greater capacity on the Khartoum - Juba route with a weekly diversion to Wau, and on the route Khartoum through El Fasher to Abeche in French West Africa. The fleet of five Dove aircraft will be employed mainly on the shorter routes calling for a high frequency of services.

It is hoped that the addition of the two Dakota aircraft will enable Sudan Airways to offer an improved, and in due course, cheaper service for freight, particularly between Khartoum and the Southern Provinces. Freight rates on Dove aircraft have been fairly high, since the Dove aircraft is costly to operate for its small load, but, with Dakotas operated at lower cost and giving more space, freight charges can probably be made more attractive, especially to places like Wau which is poorly served by surface transport at relatively high rates.

To house the expanded fleet of aircraft and to provide Sudan Airways with its first permanent maintenance base a hangar available at Wadi Seidna (a wartime air station) is being brought to Khartoum airport to be re-erected and fitted out at a cost of about £.50,000.

4. Productive Schemes

Rural water supplies and soil conservation	£.2,873,000
Forestry	150,210
Livestock and veterinary services	265,337
Fisheries	107,800
Geological Survey	72,870
Agricultural research	333,800
Investigation into alternative cash crops	130,000
Cotton growing	1,056,750
Cotton ginning, spinning and weaving	1,251,750
Agricultural Education service	250,000

Agricultural Engineering services	£.	116,000
Miscellaneous agricultural schemes		143,620
Unallocated balance reserved for agricultural schemes		500,000
Irrigation surveys		304,500
Miscellaneous irrigation items		76,000
Topographical surveys		211,260
		£.7,842,807

Rural water supplies and soil conservation

Over large areas of the Sudan, there is a shortage of assured water outside the season of rains. Rainfall may produce satisfactory pasture but this cannot be fully used for livestock grazing unless year-round supplies of drinking water can be made available for animals and livestock-owners' needs in the dry months. Nomadic tribes can move their herds and flocks seasonally in search of water and the best grazing, but for those who prefer to live a more settled life absence of assured water greatly limits the opportunities for keeping livestock. Similarly, rainfall cultivation of such crops as dura and dukhn (millets) is limited to places where water for domestic needs can be had when the rains are over. To open up new areas to livestock and raincrop cultivation, an essential step is to provide and improve rural water supplies.

The Development Programme provides about £.2½ millions for these water supplies, with allocations for bores and wells, hafirs (machine-excavated ponds or reservoirs to store rainwater for the needs of the dry season) and where the opportunities exist, a few dam or surface storage works. About half the £.2½ millions will be spent in excavating hafirs in Darfur, Kordofan, Blue Nile, Kassala, Upper Nile and Equatoria Provinces. Hafirs are planned on a 5-year sequence, where possible. In the first year, road traces, to give access to the site area, are made. In the second year, the roads are graded. In the third year, test pits are dug - to test the properties of the hafirs to come - and the hafirs sited. A year later, excavation machinery is brought up and the hafirs dug and completion works executed. In the fifth year, Government maintains the hafirs to be sure that they are in condition to give good service, andthen passes the responsibility for maintenance to Local Authorities.

Underground water resources may be tapped at economic cost in particular localities either by shallow wells or by deep bores drilled for perhaps several hundred feet below ground. For well-digging about £.120,000 is provided under the Development Programme mostly in grants to Governors of Provinces who have local knowledge to assess the chances of finding water not

far from the surface. Drilling a bore for several hundred feet may cost two or three thousand pounds, so a first step in a water drilling programme is to seek the technical advice of the Sudan Geological Survey Department on the places, within a selected region, most likely to give water at reasonable depth. On this advice, annual programmes of exploratory drilling are framed and for the 5 years 1951/56, nearly £.300,000 is provided for this work.

When an exploratory bore strikes water fit for consumption, in good quantity and at a reasonable depth, the site may be adopted for a water yard. A second, permanent, bore will be drilled close by the first, a power-operated pump installed to bring the water to the surface, and troughs and tanks built to collect the water pumped up. A house for the mechanic in charge, shelter for the plant and a simple enclosure complete the water yard, for about £.10,000 average cost, the amount varying according to the depth of bore necessary to reach water. The water pumped up is sold to the public who come to carry it away in their own cans. About 50 of these water yards will be built under the 1951/56 Development Programme for the £.500,000 provided.

Soil conservation projects are grouped with hafirs in the Development Programme since both are entrusted to the Ministry of Agriculture and draw upon common pools of plant and technical skills. About £.400,000 has been allotted for a number of soil conservation works, including anti-erosion measures, flood control, some surface water storage schemes, planned management of village lands in Kordofan Province, and the planting of trees around towns as screens against wind and blown sand.

Forestry

Forestry development will require about £.150,000. Of this, £.25,000 is for plant (machine saws, hoists and tractors) to aid wood extraction, £.5,000 for a new sawmill to serve the Aloma Plateau in Equatoria, and the balance of £.120,000 is for the building up and development of forest reserves in order to conserve timber and firewood resources.

Livestock and veterinary services

The 1951/56 Development Programme includes a group of schemes, totalling rather more than £.250,000, to promote the fuller utilisation of the Sudan's natural grassland resources and to develop the wealth that lies in its livestock.

The improvement of livestock in the Sudan and the development of a livestock industry is severely handicapped by

several environmental factors such as climate, disease, and grazing which is often poor or inadequate. Within the limits set by climate, first attention has had to be given to measures to combat these adverse factors and enable the livestock population to emerge from the "survival" stage in which there is a constant battle for life against a harsh environment. The Sudan Veterinary Service, from its inception, has been chiefly engaged in work against animal diseases and since the last War, as more funds have been made available, it has greatly intensified its attempts to control the crippling livestock diseases of tropical African climates. In this work a very substantial measure of success has been achieved in most parts of the Northern Sudan : disease is still prevalent but through campaigns for mass immunisation of cattle and other livestock, deaths from disease have been much reduced and in the northern provinces, the livestock population is steadily increasing. Here, livestock are emerging from the survival stage. The scale of control operations may be judged from the fact that mass-inoculations of cattle against rinderpest were about 900,000 in 1952.

In the Central and South Sudan, control is more difficult if only because communications are more restricted. Contagious bovine pleuro-pneumonia prevails in this region and the policy is to vaccinate as many susceptible cattle as possible in infected areas each year : in 1952, about 1,250,000 doses of vaccine were issued. In the South, below latitude 10, the cattle population finds it hard to survive against bovine trypanosomiasis, which is carried by the tsetse fly which abound in this region.

This is the background against which to set the Sudan Veterinary Service's tasks under the current Development Programme. There must be continued effort to combat disease, particularly in the South where livestock are still in the survival stage. So there is a major scheme (£.60,000) to survey the tsetse-fly belt over about 80,000 square miles and to attempt reclamation of selected areas. This belt is at present almost devoid of cattle and if areas can be reclaimed from tsetse fly successfully, a great potential of good grassland will be opened up for cattle production. There is a smaller scheme "Development of domestic livestock in tsetse reclaimed territory" to follow up work experimentally in the selected areas that are cleared. Two other schemes that fit into this programme for control of animal disease in the South are the creation of a Veterinary Training School at Malakal and the establishment of a Veterinary Service Sub-Headquarters at Rumbek.

In the Northern Sudan, there is a major scheme for mass immunisation campaigns in Kordofan Province (£.22,500)

and smaller schemes for the improvement of Veterinary Service disease control facilities in Blue Nile and Kassala Provinces. Generally, however, the emphasis in the North is on the development of the livestock industry now that disease has been brought under control and the survival stage is nearly passed.

After full control is achieved, the industry enters the "quantitative stage" when efforts are concentrated on increasing numbers and weight of animals : the qualitive stage, to improve the type of animals follows still later. Numbers are increasing now that the effect of disease is checked, but an equally serious limiting factor is the prevailing low level of animal feeding in the dry season when, in the Northern Sudan, grass is poor and scarce. It is this poor feeding which is largely responsible for the slow growth of animals to maturity, their poor milk yields, low rate of births - and, indeed, heavy losses from starvation. To overcome these obstacles, grazing resources must be improved and developed and utilisation widened. The hafirs mentioned in an earlier section will help to open up grazing not fully exploited for lack of water in the dry season. To save loss of grazing by fire, experiments in fire control are being undertaken by the Sudan Veterinary Service. Grassland is also wasted where grass is eaten up in the wet season, leaving nothing for the dry season which follows. So trials are being carried out on a large scale in Darfur, to rest land during the rains and growing season and thus to conserve a rich crop of grass for dry season use; and to divide grazing into three or four strips and to rest one strip in rotation each growing season. For this work, a first Grassland Experimental Centre is to be set up in Darfur at a cost of £.35,000.

There are also to be established a group of Livestock Improvement and Animal Industry Centres and the first three of these, for which about £.55,000 is provided in the Development Programme, will be set up in Darfur, in southern Blue Nile Province, and in the Gezira area. The matters for study, experiment and field trial in these Centres will include the rearing of livestock under better conditions, the breeding, maintenance and distribution to livestock owners of superior strains, feeding; and the processing of animal products including hides and skins and semn or clarified butter. Poultry, in which there is great opportunity for development in the Sudan, are specially catered for in a separate small £.5,000 scheme.

Fisheries

A group of fisheries development schemes provides for equipment and staff costs 1951/56 for experimental and advisory work at Juba (£.14,200), Malakal (£.22,500) and Headquarters at Gordon's Tree, near Khartoum, (£.26,600).

First attention is being given to the development of the existing fishing activities in the Nile and other Sudan rivers and in the swamps of the South. These have long been fished to provide food for family needs whilst, near towns, fish have been caught for sale to townspeople. More recently, salted fish have been growing in importance as an export to Egypt and the Belgian Congo. A great variety of experiments and trials have been started to discover means to make this river fishing more profitable. New types of boats, nets and other equipment have been designed to give better service and at lower cost than the traditional equipment. The very primitive methods of fishing practised at many places are now giving way to those tested and found better. The Fisheries Section records leave no doubt that much larger hauls are made when fishing is done at the times, with the equipment and in the manner recommended.

The methods commonly employed in salting fish for town and export markets are unsatisfactory. Greatly superior methods of drying and salting and packing fish for market have been demonstrated by the Fisheries Section and those merchants who employ the new methods are getting substantially better prices for their product.

Longer-term matters, on which investigations have been started, include the conservation of the Sudan fisheries resources. Re-stocking of rivers which are not rich in fish, by young fish from elsewhere, is the subject of trials which must extend over many years until the success of imported types can be assured. Another long-term project that should be mentioned here, is the experimental hydrobiological work of a scientist attached to the University College of Khartoum which is being aided by a grant from Development Programme funds.

In the Red Sea, quite different methods of fishing have to be adopted. Here, a Sea Fisheries Unit has been set up (£.24,500 for the 5 years) and in addition to work on fish for food has begun experimental work in the preparation of shark liver oil and in manufacture of fish meal. The other fisheries products of the Red Sea coast, mother of pearl shell, trochus shell and sponges for example, also receive attention.

At Gordon's Tree, fish farming (fattening fish introduced to excavated ponds by adding food to the natural content of the water) is under trial on a £.16,000 scheme. Preliminary results show that fish breed successfully and can be fed to good size economically. If trials continue to be successful, then fish farming should be of great interest to private enterprise : pump scheme owners could pond a few feddans of their land and grow fish as well as agricultural crops.

Geological Survey

About £.70,000 is provided for the motor transport and technical equipment to equip the Geological Survey Department which has been greatly expanded to accelerate its task of fundamental geological mapping of the Sudan.

The Development Committee gave much consideration to the question of assessing the mineral resources of the Sudan. A consulting Geologist was invited to advise on the problem. The Consultant pointed out that the extent to which mineral exploration and prospecting had previously been carried out in the Sudan, in most cases with negative results, was not generally realised. In fact, during the last fifty years or so, about two-thirds of the area of "basal complex" (the only geological formation - covering about half the area of the Sudan - which is at all likely to contain exploitable minerals) has been prospected by various companies and individual prospectors at a cost of some £.500,000. His conclusion was that it would not be advisable to embark upon an expensive specialised mineral survey at the present time.

However, it was recommended that the Geological Survey Department should be expanded and re-organised and that its work of systematic geological mapping should be speeded up. As this basic work progresses, mineral occurrences which would repay more detailed investigation might possibly come to light, although the outlook, on general geological grounds, was not promising. This fundamental work is now in hand.

Agricultural Research

The principal scheme under this heading, with an allocation of £.186,000, is the creation of a Research Station for the Central Rainlands. In the past, agricultural research in the Sudan has had to be directed mainly to the problems of cotton cultivation, especially that under irrigation, and the need for a full-scale research establishment that would be devoted to the special problems of rainfall cultivation has long been recognised.

The Station has been established at Tozi in Blue Nile Province. This site was chosen because it gives soil conditions typical of much of the Sudan central rainlands, and enjoys a rainfall of about 700mm. (30 inches) a year which is typical of the region.

The general functions of the Station are to explore and investigate the possibilities for increasing the production of food and cash crops and the animal products of the area. On a long-term programme, it is intended to carry out research into

climate, natural vegetation, soils, weeds, plant diseases, rotations and pasture, and to relate all these to improvements in farming methods. Particular attention is to be given to the needs of an expanding population for settlement in new areas; and to the opportunities for future large-scale rainfall cultivation by mechanised means.

Of special regional importance is the £.36,000 project for a Southern Provinces Research Station at Yambio (with outlying experimental units) to study the special problems of agriculture in Bahr el Ghazal and Equatoria Provinces, The scientific staff includes an agronomist, plant breeder, entomologist and soil chemist.

A second scheme of special importance to the South provides £.12,000 for experiments in grain storage in the Southern Provinces. Here, climatic conditions make storage of grain very difficult and for this reason temporary shortages occur which make it necessary to bring in grain from other parts of the Sudan at relatively high cost. Trials now going on under this scheme will show how grain must be treated (by cleaning and drying, for example) for successful storage and which of several means of storage in silos and pits are most economic.

The scarcity and high cost of forage for animals near the larger centres of population gives particular importance to a £.35,000 scheme to investigate the production of hay from vossia and prairie grasses of the Central Sudan. Another £.40,000 is allotted for trials in the technique of pond irrigation in Northern Province.

Investigation into alternative cash crops

Whilst the Sudan's dependence on cotton as a cash crop tends to be over-emphasised at times, it is a fact that development of alternative cash crops to diversify production for the market would make for a more stable Economy. To explore possibilities, a very wide programme of trials of cash crops other than cotton has been launched by the Ministry of Agriculture under a £.13,000 Development Scheme. Crops selected for attention include rice, sugar, tobacco, sisal, jute, kenaf, other fibres, coffee, kapok and drying oils. These crops appear to have prospects of development in the Southern Provinces, where the various trials are being carried out. Shortage of specialist staff means that it is not possible to attempt thorough investigation of all of the crops named but some work can be done on each and particularly full investigations are being made into the growing of rice, tobacco, sisal and coffee. Swamp rice production at the Malakal Agricultural Station and outlying experimental units has given encouraging

preliminary results and a pilot scheme has been developed.

Cotton Growing

There is a major project, running beyond £.1million, for the development, in Government ownership, of a 30,000 feddan pump-irrigated scheme at Guneid, in Rufaa District of Blue Nile Province. The chief cash crop will be cotton, but the dura to be grown is of great importance too, since this is a district in which grain is sometimes scarce after poor rains. It is likely that the Scheme will give holdings of 15 feddans to each of 2000 tenants, supporting directly perhaps 12,000 people. This would mean a great contribution, in larger and more assured incomes, to the prosperity of a poor district.

When all pumping plant is installed, irrigation will be possible over about 20,000 feddans, leaving one-third of the land resting uncultivated each year. The individual 15-feddan holding will probably grow cotton over 5 feddans, dura over about 2½ feddans, and probably groundnuts and a forage crop such as lubia over a similar area, leaving 5 feddans resting in rotation each year. To meet the costs of maintaining the scheme, agricultural supervision and other annual expenses and to earn a return on its capital investment, Government is expected to take a 60 per cent share on the profits of the cotton crop; this is the usual share on such pump schemes in the Sudan. It will also share in any other crops, such as groundnuts, grown for sale. Tenants would have the balance of 40 per cent of the cotton profits, would keep dura for family needs and the forage crops for their animals and in addition would share in dura or groundnuts or other crops grown for sale.

Cotton ginning, spinning and weaving

With the increased areas under cotton cultivation in the Sudan, additional ginning capacity becomes necessary. A new roller ginnery and additional equipment for the existing Government ginning factory at Port Sudan have been provided for about £.175,000. Port Sudan handles the flush-irrigated cotton crop of the Gash and Baraka (Tokar) Deltas.

For rain-grown cotton, additional ginning and processing plant is being installed at a cost of about £.70,000. Most of the new plant is to serve the Nuba Mountains cotton industry. Additional saw gins have been put in at Semeiha. Seed heaters will be installed at two centres to treat cotton seed to give more effective control of bollworm. Delinting machinery is also on order : to delint seed for sowing, oil extraction or fuel. The sale value of the linters should more

than cover the cost of the process and delinting facilitates treatment in the seed heaters and processing in the oil mill; cotton seed for export will not be delinted. Elsewhere, additional saw gins for raingrown cotton have been provided at Gedaref, and at Ghaba to serve the Dongola area.

£.1 million is provided to establish a cotton spinning and weaving mill in the Northern Sudan. A preliminary survey for this project has been made but the scheme has not yet reached the detailed design stage.

Agricultural Education Service

This scheme, for which an initial £.250,000 is provided, will consolidate the Ministry of Agriculture's existing training, advisory and information services in a distinct Education Division which would then be expanded to give a wide range of facilities to farmers.

The Headquarters of the Division are to be at Shambat, near Khartoum North. Here, there will be laboratories for Education Service specialists in the chief branches of agriculture and an Information Section to present the specialists' work and other material to the public. In the provinces there will be a farm advisory organisation. On the education side, there is to be an Institute for Agricultural Training at Shambat and smaller training farms at provincial centres.

Agricultural engineering services

The chief scheme under this head is that for trials in mechanised production of dura and groundnuts, for which £.72,000 is provided. This continues trials in mechanised crop production begun in the 1946/51 Development Programme. Other schemes provide workshops for servicing agricultural machinery and housing for engineering staff.

Irrigation Surveys

There are four schemes under this heading, each to the purpose of collecting information on which to base plans for expansion of irrigated agriculture when the Sudan may be able to draw off more water for irrigation from the Nile. £.155,000 is provided for a first scheme to estimate the areas of the Northern Sudan other than the Gezira which give prospects for economic irrigation by water from the Blue Nile and its tributaries and from the White Nile as far south as the Sobat. This survey is necessary both for negotiations with the Egyptian Government on Nile waters and for long-term planning of economic

development in the Sudan : it will provide a basis for a forecast of the Sudan's future requirements of irrigation water. This survey has been entrusted to Sir Alexander Gibb & Partners, the Consulting Engineers. The Sudan Survey Department has completed a second and supplementary scheme, to ascertain the levels of land along the banks of the Main Nile, for about LE.25,000. Sir Alexander Gibb and Partners have also in hand a £.115,000 preliminary investigation at the proposed site of a Blue Nile reservoir near Roseires; the dam will be at the Damazin rapids. It is hoped that the reservoir capacity will be rather larger than that of Sennar which controls the Gezira Scheme. The fourth scheme, at a modest £.10,000, enables the Sudan Irrigation Department to make a preliminary survey for a South-Western extension of the Gezira irrigated area.

Topographical Surveys

The biggest scheme, at £.90,000, is chiefly for a variety of air photographs surveys which the Sudan Survey Department are carrying out with Sudan Airways aircraft. These surveys, of selected areas, provide data on which other units can base their development plans - most notably in forestry, soil conservation and hafir construction. This scheme also provides the funds to enable maps to be compiled from existing air photographs covering about two-thirds of the Sudan which were taken by the United States Government.

A second scheme, for which £.45,000 is allotted, is to continue the triangulation programme (which fixes points and distances for accurate close survey and mapping) which was begun in the 1946/51 Programme.

Other Survey Department schemes provide for a further stage in precise levelling (also continued from the 1946/51 Programme) additional plant for printing and map production and additional offices to accommodate an expanding service, essential to basic economic development in this country.

5. Public Utilities

Advances to Sudan Light & Power Co., Ltd. and Wad Medani Light & Power Co., Ltd.	£.2,915,000
Loan to Khartoum Municipality for Waterborne Sewerage Scheme	1,000,000
Piped water supplies for various towns	660,550
Electricity supplies for various towns	193,500
General expenditure on public utilities	176,000
Unallocated balance for public utilities	200,000
	£.5,145,050

Advances to Sudan Light & Power Co., Ltd.

This company's capital is owned by Government. It provides electricity and water, and some other services, to the Three Towns of Khartoum, Khartoum North and Omdurman.

The growth in numbers of the population of these towns, the new building for residential and business purposes since the War, and the great increase in the public's purchasing power have brought a great increase in the demand for electricity and water. The company is working to an 11-year plan 1950-1960 for capital works to increase its capacity to meet forecast public demand for its services. On present estimates, 1950 to 1956 capital expenditure will run to about £.3½ millions. Some part of this can be found from the Company's own resources, including advances made to it by Government before the 1951/56 Development Programme was launched. The balance, to be found from this Programme, is £.2,750,000. It will be observed that this provides only for expenditure to 1956 : for 1957/1960, additional funds will be necessary to complete the company's capital works programme.

The Wad Medani Light and Power Co., Ltd., operating in that town, and also Government-owned, has need of funds for expansion and for this company the Development Programme allocates £.165,000 for advances for new capital works.

Loan for Khartoum waterborne sewage scheme

The Khartoum Municipality has in hand the provision of a waterborne sewage system for Khartoum city. Towards the cost, Government has offered to lend £.1 million.

Piped water supplies

In the larger provincial towns, it may be economic to pump filtered water to conveniently situated standpipes instead of leaving the public to fetch it in cans from the source of supply (usually bores drilled to release underground water). The current Development Programme provides about £.660,000 for these piped water supplies: for 15 towns at present without piped water and for extensions to existing systems in 7 other towns. These schemes are operated by the Public Works Department.

Electricity supplies

Electricity is much more of an amenity than water and for this reason and the fact that it is only in the larger towns that an electricity supply can pay its way on a reasonable

scale of charges, less than £.200,000 is provided for electricity schemes in the Development Programme. It may be said that a considerable number of proposals for town electricity plants were considered but at present-day capital, labour and fuel costs it was clear that electricity could not be produced for an attractive price. A number of electricity schemes shown in the 1951/52 and 1952/53 Development Programme Budgets were withdrawn at the 1953 review as being now too costly to operate without loss.

The £.200,000 will give a new supply to Shendi and extend existing electricity systems in four other towns. As with piped water schemes, the Public Works Department maintain electricity supplies outside the Three Towns and Wad Medani, where the two Light and Power Companies (and these are Government-owned) operate.

General expenditure on public utilities

This item provides £.176,000 to meet the design, planning and supervisory costs of carrying out the programme of electricity and water schemes for the provincial towns. The full cost of the individual scheme will thus include a proportion of this General Expenditure item.

An unallocated balance of £.200,000 is being held in reserve for public utilities. It is expected that on closer estimation of some of the schemes yet to be started the present allocations will have to be increased and this reserve will then be partly absorbed. If any balance should remain, there are proposals in hand for schemes that would be economic in other towns.

6. Social Services

Ministry of Education Services	£.3,540,000
University College of Khartoum	562,620
Health Services	2,373,000
Broadcasting	175,000
Population Census	130,880
Workers Housing Experiments	68,000
Miscellaneous Items	36,000
	£.6,885,500

Ministry of Education Services

The allocation for the Ministry of Education stands at £.3,540,000. It is planned to proceed, so far as is possible within this provision and so far as building capacity permits, with the following programme, which is part of a 10-year plan for educational expansion.

Secondary Schools

Three new secondary schools for boys are planned at Khartoum, Atbara and Rumbek.

Technical Schools

£.178,000 is provided in the 1951/56 Development Programme to expand the Khartoum Technical Institute, which was begun under the 1946/51 Programme.

A new technical school is planned for Juba.

Intermediate Schools

The programme includes 6 new intermediate schools for boys and three new intermediate schools for girls.

Elementary Schools

There are included 120 new "full" elementary schools, each catering for 200 boys and 65 "full" elementary schools for girls, each to have 160 pupils. There are also 30 "half" elementary schools for boys, each with 100 places.

Rather more than £.300 000 will be spent on improvements and extensions to existing schools, mostly elementary schools. About £.200,000 is allotted for buildings to improve and enlarge the teacher training institutions at Bakht er Ruda, Dilling and Shendi from which will flow the greater part of the teachers to staff this programme of educational expansion.

To equip the schools, it has been necessary to provide £.84,000 for technical education apparatus and £.265,000 for general schools furniture and equipment.

Grants to non-Government Schools

To assist non-Government schools to expand, capital grants are available towards the cost of new buildings and equipment from provisions totalling £.500,000. Of this, £.400,000 is earmarked for schools in the Southern Provinces. These grants are distributed through the Ministry of Education and are part of the programme of educational development.

University College of Khartoum

About £.560,000 is allotted for additional buildings for the expanding University College of Khartoum. On the teaching side, £.60,000 is provided for an extension to the School of Arts, £.52,000 for an Anatomy and Physiology Block, £.29,000 for alterations to the Kitchener School of Medicine main building, £.12,000 for a botany block for the School of Agriculture, £.12,000 for a veterinary teaching hospital and nearly £.190,000 for staff housing. To accommodate the growing numbers of students, most of whom are resident, there is nearly £.200,000 for further hostels in Khartoum and, for agricultural students, at Shambat.

Health Services

£.2,373,000 has been allotted for the 5 years from 1951 to 1956 to cover capital expenditure on buildings and equipment for a broad programme of expansion for all the health services.

It was hoped that it would be possible, as part of the 1951/56 Development Programme for the Ministry of Health to proceed accordingly to the first 5 years programme of the ten-year (1951/60) Expansion Plan submitted by the Minister in 1951. It is now realised that shortage of building construction capacity, fast rising costs of buildings and equipment and some other difficulties may limit what can be achieved by 1956.

However, as much as possible of the following programme will be done:

New Khartoum Hospital: the major project, to cost about £.850,000 (on present estimates) is for a new hospital at Khartoum. This will have about 350 beds and be fully equipped as a specialist hospital and as a training centre for students of the Kitchener School of Medicine.

Other hospitals: a £.100,000 specialist tuberculosis hospital is planned for Khartoum, in association with the new teaching hospital. In provincial centres a series of eight 100-bed hospitals to more modest standards is proposed whilst another hospital is to be created at Zalingei by up-grading the dispensary there.

Other hospitals are to be substantially improved and specialist services extended to all provinces, both for in-patients and out-patients. Tuberculosis wards are planned for a number of existing hospitals in various centres.

Dispensaries: a great number of new dispensaries are to be established, and many existing dispensaries are to be improved in accommodation and equipment. Many of these will include housing for the dispensary staff.

Welfare Centres: for the chief towns, the programme includes welfare centres to provide mother and child care.

Midwives' Training Schools: a group of new training schools with hostels are planned, together with extensions to the present institution at El Obeid.

Public Health Offices: existing public health offices will be improved as necessary and a number newly built to give wider service.

Student Nurses' Hostels: rapid expansion in the number of female nurses is planned, and to effect this, hostels for students will be attached to training hospitals.

Staff Housing: staff will have to be greatly increased to man the new medical treatment centres and there are also considerable increases in staff proposed for the medical officer of health cadre, the public health inspectorate, and for midwifery, nursing and laboratory services. To accommodate part of this increased senior staff, a great number of new houses are to be built.. An even larger number of more modest houses for junior staff are to be built with the new dispensaries, welfare centres and training schools.

In addition to £.200,000 provided for equipment for the New Khartoum Hospital, the Ministry of Health share of Development Programme funds allows another £.89,000 for equipment and fittings to furnish the new and improved dispensaries and hospitals and other institutions that are to be built.

A much smaller scheme of £.15,750 provides a laboratory and some associated buildings for a team of specialists appointed to conduct research into bilharzia infection in the Gezira area where there is a fairly heavy incidence of this debilitating disease. If bilharzia can be controlled adequately, there will be positive aid to productivity in the Sudan for this is a disease which acts to lower the working capacity of infected persons.

Broadcasting

Broadcast services play an extraordinarily important role in a society such as the Sudan, where large numbers do not read and where cheap yet reliable printed matter is lacking for many of those who are literate. The very great area of the Sudan and its relatively sparse population make broadcasting the only economic means of communication to large numbers, an essential source of reliable and timely public information and a not unimportant cultural and entertainment medium. For these reasons, broadcasting finds place as a social service and with Development Programme allocations appropriate to its importance. There is £.75,000 provided for new broadcasting studios at Omdurman and £.100,000 for a powerful broadcast transmitter to give better service and to ensure reception in parts of the Sudan which are not well served by the low-powered transmitters of Radio Omdurman, now available to Government's Sudan Broadcasting Service.

Census of population

The Sudan has not yet conducted a national census, and it is proposed to go some way towards remedying this omission by holding a sampling census covering all areas of the Sudan but calling for returns from only a proportion of the population selected at random. For this sampling census £.120,000 has been provided. Preceeding it, to discover the best methods of conducting the fuller census, there will be a pilot census costing perhaps £.11,000.

The census will provide information that is very necessary for planning and future development. It is important to learn the numbers and distribution of the people, their sex and age distribution, and to a limited extent, their occupations. With this information it will be possible, for example, to assess the food and supply needs of particular regions more accurately, and to plan new agricultural, and possibly commercial, projects in the knowledge that labour will be amply available.

Workers housing experiments

Housing construction costs in the Sudan are extremely high and building to standards necessary to ensure a reasonable life for a dwelling is at present quite beyond the reach of the average industrial worker. The alternative usually adopted, of cheap construction in mud, gives adequate accommodation but at an heavy annual cost in maintenance and with risk of collapse in times of heavy rains and flood.

The Labour Branch of Sudan Government has begun experiments in means of lowering building costs on existing forms of construction and to prove cement-and-sand-mix blocks that make for cheaper and speedier construction than ordinary burnt brick yet assure a similar permanence. For this work, the Development Programme provides £.68,000 and within this sum there is £.50,000 allocated to build a first estate of about 200 workers' houses, using the new blocks and economical methods of construction, for about £.50,000. These houses would be sold to artisans, probably on instalment - payment terms. If the initial estate proves attractive, it is hoped that it may be possible to interest private enterprise in the new methods.

7. Administration

Loans and Grants to Local Government Authorities	£.1,200,000
General Staff housing	672,800
Motor transport vehicles and workshops	420,000
Prisons	169,250
Police College and Police Stations	161,500
Law Courts	51,000
Miscellaneous (chiefly buildings for an expanding Administration)	1,432,550
	£.4,107,100

Loans and Grants to Local Government Authorities

To assist the growth of local government in the Sudan, the Central Government is prepared to make grants towards the cost of administrative buildings such as Council offices and court houses. It also offers grants to assist in expenditure on roads, which have more than a local importance, and on buildings for sub-grade schools in Local Government charge. There is a fixed maximum percentage of grant under each heading, so that in every case the council must find part of the cost. A Local Government Loans and Grants Advisory Board considers each application for grant and will only recommend the maximum percentage where there is no possibility of the Council being able to afford a larger share of the cost. For these grants, the Development Programme provides a total of £.450,000.

For local government capital expenditure not acceptable for grant, there are offered loans from a Local Government Loan Fund for which £.750,000 is provided in the current Development Programme. Some applications for loans are for schemes which will bring good revenue and so enable the loan to be repaid without difficulty : these include schemes for building markets

and shops for rent, which may yield a very handsome return. Other loan expenditure may reduce costs substantially, as for example on schemes to mechanise conservancy services. Staff housing is generally financed on these loans and there has been some building of low-cost housing for rent to the public. The poorer Councils may raise loans to finance that part of the cost of grant-aided projects such as offices and roads which is beyond the maximum permissable percentage.

General staff housing

Outside the Three Towns, houses of the standard conventional to officials (as distinct from artisans and labourers) are not available for rent in any very large numbers. Whilst Government naturally does not undertake to accommodate its officials, it is necessary, particularly at the more remote outstations, for Government itself to build houses for rent to a high proportion of its officials.

With Development Programme schemes, housing, where necessary, is included in the project. Thus, of the £.186,000 provided for the Research Station for the Central Rainlands about £.120,000 is for staff housing. In this particular case, the Station is some distance from the nearest village and Government has had to provide housing for labourers as well as officials. Most projects outside the Three Towns include some provision for housing : with most schools there go masters' houses and with dispensaries a house for the medical assistant.

Government staff generally are increasing in line with the administrative expansion outside the Development Programme and to provide houses for a proportion of this increased staff, the Development Programme allocates a total of £.672,800 for housing spread throughout the country.

Motor transport vehicles and workshops

The motor vehicles necessary to carry through the Development Programme and those to be attached to serve newly completed Development projects (for example, ambulances to be attached to a new hospital) are provided for in association with Development Schemes. There are nearly 700 such vehicles.

In addition, the expanding general administrative services in this country of great distances call for additional motor transport. To meet this need, £.250,000 is provided in the Development Programme for vehicles and this will buy about 300 trucks and cars.

To service the Government motor transport fleet of more than 2200 vehicles (counting here vehicles for both Development projects and the general administrative services) the Mechanical Transport Department maintains a body building plant and central workshops for major repairs and overhauls at Khartoum North, and a network of workshops for routine servicing at centres throughout the country. To improve, extend and to better equip these units, the Development Programme allocates £.170,000.

Prisons

The largest project is for a new prison at El Obeid at £.45,000. An habituals prison in the Red Sea Hills is planned at £.40,000 to separate the hardened offenders on the long-term sentences. For Darfur Province, there is about £.25,000 allocated for a series of prison settlements or camps where prisoners can be engaged on quarrying and similar useful work. Other new prisons are being built at Juba (£.15,000), Yambio (£.15,000) and Rumbek (£.14,500). A farm camp for young offenders established at Abu Geili, near Khartoum, for £.4,[illegible] is a modest pioneer project that has attracted favourable comment.

Police College and Police Stations

For a new Police College, to replace the present inadequate group of buildings used in officer training at Omdurman, there is allocated £.57,500.

A little more than £.100,000 is provided for new police stations in the Three Towns, Atbara and El Fasher.

Law Courts

There are two schemes, one at £.45,000 to build a court house at Omdurman and the second at £.6,000 for a more modest court building at Juba.

Some miscellaneous items

A major item included under this head is the £.419,000 for general expenditure on the salaries of additional planning, design, quantities and supervisory staff, and on other overhead costs necessary for the Public Works Department to carry out the great number of building projects that are in the Development Programme.

The Public Works Department has itself called for increased accommodation and better facilities to enable it to

undertake the great volume of work necessary to the Programme. So there are schemes for new workshops (£.96,800), new stores (£.78,500) and additional equipment and plant (about £.150,000 - additional to items mentioned in previous sections).

About £.500,000 is set aside to be allotted on the advice of a Public Works Board to help meet demands for an immense variety of small building works (other than housing) to improve services of the Administration throughout the country. This sum is restricted to minor items, not costing more than £.5,000.

Among building projects not previously touched upon in this account, there should be mentioned the new Senate House which, with some offices for new Ministers, is allotted £.55,500. Expansion of the Stores and Ordnance Department to handle the great increase in stores necessary to the Development Programme requires £.40,000. Offices and housing for a newly-introduced Weights and Measures Service stand at about £.21,000. A new sugar store at El Obeid (Government having a monopoly in the import of sugar) is to be built for £.10,000.